HEFS-1.2.1 Release Notes

Release Date: 10/28/2014
Release Type: Scheduled
HEFS Build: 1.2.1
Build and Package Date: 10/14/2014
Tested against FEWS Binary: 2014.01, build: 48767 (patched from 47633)

Introduction

This document contains release notes for HEFS-1.2.1.

- **IMPORTANT:** Prior to installing this release of HEFS-1.2.1, you should upgrade to CHPS-5.0.1 or later.

- MEFPPE and EnsPostPE have changed, and the MEFP parameters will need to be re-estimated.

- In the latest FEWS release, a change in FEWS transformation behavior was discovered. Previously in MEFPPE, setting ignoreMissing to false outputs -999 for missing data. Now setting ignoreMissing to true or false outputs a filler value. To return MEFPPE to its expected functionality, two configuration files, MEFP_MAP_to_GMT.xml and MEFP_MAT_to_TAMN_TAMX.xml, are included and they need to be installed using the instructions in FogBugz 1528. (http://schuylkill.nws.noaa.gov:7069/default.asp?1528). This issue is being discussed with Deltares.

- MEFP no longer generates raw climatology, so the MEFP run file property useResampledClimatology is ignored and can be removed from adapter configuration files.

- To reproduce operational results, the MEFP and EnsPost random number generators can be seeded with a non-zero initial value by using the run file property 'testing'. For example:

  <string key="testing" value="141085139505"/>

  The seed used during an operational run will be output to the log file. Set the testing property value to that seed in order to regenerate results. See the MEFP User's Manual and the EnsPost User's Manual for details.

- This release includes changes to Graphics Generator. Older versions of Graphics Generator, including CHPS 5.0.1, may not be able to work with templates edited using this new version. For that reason, if the version of Graphics Generator included in this release of HEFS is used to edit Graphics Generator templates, then the version included in this release (or a newer version) <u>must</u> be used for all Graphics Generator purposes that use those templates.

- Below are two tables of the fixes and enhancements in this release. Following that is a list of changed documentation. Afterwards, the fixes and enhancements are described in detail.

- The HEFS Test RFCs are expected to test existing, fixed, and new HEFS functionality which they reported and/or requested. <u>The Test Manual provided in this release further specifies what testing is expected from each RFC and contains the test procedures.</u>

Fixes

FogBugz ID	Reported By	Title
1231	ABRFC	EnsPost seasonal discontinuity
1427	ABRFC	MEFPPE using historical forecast date
1494	Hank Herr (OHD)	Probability of Precipitation (PoP) biases in MEFP forecasts
1545	James Brown (OHD)	EVS failure to aggregate observations to forecast scale

Enhancements

FogBugz ID	Requested By	Title
1059	CNRFC	Display probabilistic inflow volume accumulation plot
1435	Hank Herr (OHD)	Backup MEFPPE SFTP server
1438	CBRFC	EVS rolling aggregation
1442	Hank Herr (OHD)	HEFS Aptima product
1479	James Brown (OHD)	EVS accept NaN as missing value
1483	James Brown (OHD)	EVS discriminate input time-series by ensembleId
1493	CNRFC	GraphGen aggregator enhancements
1496	CNRFC	GraphGen axis display

Documentation

The following documentation has been modified since the last release and can be found in the 'documentation' directory at the root of the package. All the HEFS documentation may be found online at http://www.nws.noaa.gov/oh/hrl/general/indexdoc.htm.

- *Modified:*
    - EnsPost Configuration Guide: Forecast Components
    - EnsPost Users Manual
    - EVS Users Manual
    - HEFS Graphics Generator Products Installation Guide
    - HEFS Overview and Getting Started
    - HEFS Test Manual 1.2.1
    - Hindcasting Guide
    - MEFP Configuration Guide: Data Ingest
    - MEFP Configuration Guide: Forecast Components
    - MEFPPE Configuration Guide

- o MEFP User's Manual
- o Hindcasting Robot User Manual

Notes

Fix: FogBugz 1231 - EnsPost seasonal discontinuity

Description

EnsPost mean trace jumps when parameters change at a seasonal boundary.

Cause

Previous EnsPost behavior was to use forecast issue time to determine which seasonal parameters to use. This was fine for medium-range forecasting as nothing much changes in ~14 days in terms of streamflow climatology. However, for long-range forecasting, when the forecast horizon crosses a seasonal boundary, it meant that parameters from the "wrong season" could be used for a large chunk of the forecast horizon. A switch was made in HEFS 1.0.1 to use forecast valid date to determine which season applies and the parameters can change during the forecast horizon. The downside is that it leads to discontinuities if the EnsPost parameters from the two seasons are quite different.

Fix

When the forecast horizon is medium-range (i.e. 15 days or less), do not allow the EnsPost seasonal parameters to change part-way. For a given T0, if the EnsPost seasonal boundary falls within the first 14 days of the forecast horizon, use the parameters that apply to the next season for the complete forecast horizon for that T0 (i.e. use the seasonal parameters that apply to the latter portion). Otherwise, use the seasonal parameters according to forecast valid date. As a further step, if the overall forecast horizon is 14 days or less, and the seasonal boundary falls within this period, use the seasonal parameters for that T0 (throughout the forecast horizon) for which the largest portion of the forecast horizon falls in that season.

Notes

Fix: FogBugz 1427 - MEFPPE using historical forecast date

Description

MEFPPE complains of missing GEFS data when GEFS data is present.

Cause

MEFPPE is using a historical forecast date (1940) instead of the range of the GEFS reforecast time series (through 2014) when calculating canonical event values.

Fix

MEFPPE will look at the time series data instead of using the historical forecast date.

Notes

Fix: FogBugz 1494 - Probability of Precipitation (PoP) biases in MEFP forecasts

Description

MEFP underestimates the true (observed) PoP; the MEFP forecasts contain a dry bias. These biases are evident in the long-range forecasts produced with forcing inputs from the CFSv2 and resampled climatology. Furthermore, for the long-range forecasts, they are most severe during the period 16-30 days when using CFSv2 forcing.

Cause

HEFS 1.1.1 MEFP comprises two algorithms for modeling precipitation intermittency; the Explicit Precipitation Intermittency (EPT) algorithm is used for short-to-medium range forecasting (RFC and GEFS), and the Implicit Precipitation Intermittency (IPT) algorithm is used for long-range forecasting (CFSv2 and resampled climatology). The IPT algorithm is less desirable, as it requires a subjective (and scale-dependent) separation between "wet" and "dry" conditions, whereas the EPT algorithm defines wet conditions consistently as a precipitation amount that exceeds the minimum detectable precipitation (0.25mm or 0.01" by default). The IPT algorithm was thought to convey some advantages for predicting aggregated precipitation amounts at long forecast lead times, but these advantages have not been adequately demonstrated.

Fixes

1. Use the EPT algorithm for all forecast horizons.

2. Use the EPT threshold in EVS validation.

Notes

MEFP improvements are ongoing; see also FogBugz 1509 and 1510:

> http://schuylkill.nws.noaa.gov:7069/default.asp?1509
> http://schuylkill.nws.noaa.gov:7069/default.asp?1510

Fix: FogBugz 1545 – EVS failure to aggregate observations to forecast scale

Description

Forecasts and observations are paired at a common temporal scale. When the forecasts and observations comprise different temporal scales, one dataset must be aggregated (since disaggregation is not supported). When attempting to aggregate observations, an exception is thrown, indicating that the *forecasts* cannot be *disaggregated*.

Cause

The computeAndSetPairs method of the PairedDataSource.java determines separately whether the observations or forecasts require a change of scale. A change of scale in one is mutually exclusive of a change of scale in the other. However, an if/else design was not used in determining whether to aggregate the forecasts or observations. Following aggregation of the observations, a separate test was applied to the forecasts, which resulted in an exception (indicating that the forecasts could not be disaggregated).

Fix

Updated the computeAndSetPairs method of PairedDataSource.java to use an if/else design in testing whether to aggregate the observations or forecasts.

Tested the updated method with an example that required aggregation of the observations, as well as an example that required aggregation of the forecasts. In both cases, the appropriate data was aggregated, without an exception being thrown.

Enhancement: FogBugz 1059 – Display probabilistic inflow volume accumulation plot

Description

Probabilistic inflow volume accumulation plot cannot be created using Graphics Generator.

Cause

For a volume accumulation plot, users can only specify a period start, period end, and period time step. A "Computation Time Step" is required to allow either a default (computation time step = period time step) or a user specified time step (similar to the period time step). These changes were delivered previously, but were not sufficient to generate the plots required. For HEFS 1.2.1, an additional option, Prefix with Zero, was added to the **GraphGen Editor** allowing for the lines in the plot to all start from the same value: 0.

Fix

Add Computation Time Step to Graphics Generator. Add Prefix with Zero ability to Graphics Generator.

Notes

Enhancement: FogBugz 1435 - Backup MEFPPE SFTP server

Description

When the MEFPPE reforecast data SFTP server goes down, rollover to a backup.

Cause

No way to specify backup server.

Fix

Add backupServerName to follow serverName in griddedDataSFTPParameters.xml to specify one or more backup servers.

Notes

Enhancement: FogBugz 1438 - EVS rolling aggregation

Description

EVS aggregation of the verification pairs does not support a rolling aggregation, only a back-to-back aggregation of the input time-series.

Cause

Working as designed.

Fix

Extend the getTimeAggData method to support rolling aggregations of input time-series (observations, forecasts or pairs) with a specified interval between aggregations.

Notes

Enhancement: FogBugz 1442 - HEFS Aptima product

Description

The HEFS "Aptima product" is the first planned HEFS product. OHD will initiate the process of providing this to the public as an experimental product.

Cause

Fix

Installation instructions are given in the HEFS Graphics Generator Product Installation Guide. Instructions for those RFCs that have already installed prior HEFS products are noted below and provided in FogBugz 1442:

> http://schuylkill.nws.noaa.gov:7069/default.asp?1442

Notes

Installing this new HEFS product requires the following steps:

0. Prerequisite: the AHPS products have already been setup. As explained below, the new HEFS products make use of AHPS product settings, so that installing the AHPS products, or at least setting up the arguments, becomes a pre-requisite.

1. Add queries to .../Config/PiServiceConfigFiles/HEFSGraphGen.xml; see below.

2. Start the SA being used to edit the products. It should already include the old HEFS products and have the data necessary to display them so that you can see the new products.

3. Import the new (attached) hefsInstallationImport.xml product file. It will overwrite the existing HEFS products.

4. Use the Modify Settings Dialog to remove the settings hefsDisplayTimeZone and hefsFloodingThresholdId; see below.

5. Import the settings file hefsSettingsImport.xml. Modify the settings as needed; see below.

6. Modify any customized HEFS products (such as those created for reservoirs) so that they do NOT use the settings removed in Step 4. You should change all uses of "hefsDisplayTimeZone" to "ahpsDisplayTimeZone" and "hefsFloodingThresholdId" to "ahpsMinorFloodingThresholdId". You can use the GraphGen Editor for this purpose or shutdown the SA and modify the local area file by hand (Models/graphgen/OHD*.xml).

Enhancement: FogBugz 1479 - EVS accept NaN as missing value

Description

EVS accepts only numeric values as a missing value identifier (e.g. -999). It does not accept non-numeric values, (e.g. NaN). CHPS defaults to NaN to represent missing values.

Cause

Working as designed.

Fix

NaN now accepted as a missing value.

Notes

Enhancement: FogBugz 1483 - EVS discriminate input time-series by ensembleId

Description

EVS data handlers discriminate time-series by locationId and parameterId. However, a forecast file may contain several time-series for any given location (locationId) and variable (parameterId), which differ only by ensembleId.

Cause

Working as designed.

Fix

Add discrimination by ensembleId.

Notes

Enhancement: FogBugz 1493 - GraphGen aggregator enhancements

Description

Add to the GraphGen aggregators:

1. Relate start/end periods to calendar/water year,

2. When the T0 is within the season of interest, only calculate the residual volume (T0 to end of season),

3. The number of days to peak counter, for a specified season, should start from T0.

Cause

Fixes

1. Add two properties to define a time period during which the adapter should generate products. If the T0 is not in that period, then the adapter exits immediately with a warning message but no error. The start/end dates will not care about the year used in the dates, but will focus on months, days, hours, etc.

2. Add an Ignore Missing checkbox to all aggregators (addresses the issue when T0 is within aggregation window).

3. Add a basis date applicable to the counter aggregator. Counter aggregations that involve counting days/timesteps will be performed as currently done, but the output will have a value added to it equal to the difference between the default basis date and this user-set value.The default basis date will be set to "tsStartTime", which matches the current default behavior.

Notes

Extensive discussion of the improved aggregators can be found in FogBugz 1493:

http://schuylkill.nws.noaa.gov:7069/default.asp?1493

Enhancement: FogBugz 1496 - GraphGen axis display

Description

A number of products use the GraphGen axis translator to plot flow on the primary y axis, and stage on the secondary y axis. However, some of the locations (reservoirs) don't have a rating curve (flow to stage translator). For these plots, an error message is displayed on the secondary y axis. Prefer to not display anything at all on the secondary y axis if a rating curve is not found.

Cause

Working as designed.

Fix

If an axis translation fails, a warning message will be generated and that axis will not be visible within the plot.

Notes